

Summary of GFDL-NCEP 11/30/12 Ocean Modeling Meeting

The rich history and collaborative future of NOAA ocean modeling was evident on Friday, November 30, 2012 as leading scientists from NOAA's National Centers for Environmental Prediction (NCEP) and Geophysical Fluid Dynamics Laboratory (GFDL) met to discuss common historic, ongoing, and subsequent interests and efforts. The meeting was planned and coordinated by the Climate Program Office's Modeling, Analysis, Predictions, and Projections program in conjunction with NCEP and GFDL. For this focused meeting, a group of GFDL scientists visited the new NOAA Center for Weather and Climate Prediction in College Park, Maryland to discuss ocean modeling-related topics including GFDL's Modular Ocean Model (MOM), ocean data assimilation efforts at each institution, as well as interests and activities associated with observing system experiments.

A number of initiatives emerged from the meeting, each of which is built off independent work at GFDL and NCEP as well as ongoing collaborations in a variety of areas including Observing System Experiments; use of the Modular Ocean Model, version 3; and the National Multi Model Ensemble. These initiatives are summarized below:

1. The latest release of the GFDL ocean model (MOM5) will be migrated to NCEP for operational use in NCEP's next-generation coupled model. This initiative will include an effort, on GFDL's part, to make this version of MOM compliant with the Earth System Modeling Framework so as to facilitate its integration into NCEP's modeling framework. GFDL has developed documentation as well as training materials and exercises that can ease the model's integration into NCEP's CFS.
2. NCEP is looking to improve the quality of the modeled daily cycle of ocean temperature near the surface, as the fidelity of the ocean's top layer is critical on time scales of interest to NCEP. GFDL indicated that the next major version of MOM, MOM6, may help ameliorate existing issues as resolution can be increased substantially near the surface. This topic represents both a current NCEP need as well as an ongoing GFDL area of research.
3. Arctic sea ice is a high priority topic for NOAA. Both NCEP and GFDL seek to improve the representation and simulation of Arctic ice conditions in their climate models. GFDL is working to incorporate the CICE sea ice model, developed by the Los Alamos National Laboratory, into MOM6. A leading motivation for this activity is an interest in seasonal ice prediction, which is shared by GFDL and NCEP. Integrated ice modeling is an area where the two institutions will seek to collaborate as next-generation coupled systems are developed.
4. NCEP's WAVEWATCH modeling activity is committed to linking with climate timescales by including a greater number of passed variables in the model. In addition, future developments of WAVEWATCH will include tri-polar coordinates and high resolution, which will enable linkages with advanced versions of MOM. GFDL intends to incorporate Langmuir Mixing into MOM6, which has positive implications for WAVEWATCH performance and coupling between the advanced WAVEWATCH and MOM models.

5. NCEP/GFDL discussed current collaborative work on Observing System Experiments and how they plan to jointly explore the value of ocean buoy systems and their role and value as a component of the larger observing system, including Transpose-AMIP runs at NCEP that may offer collaborative possibilities between GFDL and NCEP.

During the meeting, more general discussions revolved around how NCEP's operational forecasts could benefit from better performance in simulating particular coupled phenomenon, an area that GFDL, with its research investments in exploring the impacts of model parameters and configurations, can inform. In addition, the group discussed how ocean modeling has an influential role at the interface between long-term climate and shorter climate/weather timescales. Ongoing discussions of a "seamless" prediction system are critically dependent upon ocean modeling efforts and directions, the initial vs. boundary condition problem, and the distinct Earth system timescales GFDL and NCEP orient their activities around. At this interface lies the potential for a great deal of collaboration between these two institutions. Aside from fostering the ongoing collaborations and new initiatives, the two institutions will be more aggressive in collaborating on joint publications and applying for joint funding. GFDL will participate at whatever level is practical and most useful in the development of version three of NCEP's CFS.

Meeting participants: Alistair Adcroft (GFDL), Don Anderson (CPO), V Balaji (GFDL), Dan Barrie (CPO), David Behringer (NCEP/EMC), Tom Delworth (GFDL), John Derber (NCEP/EMC), Steve Griffies (GFDL), Robert Hallberg (GFDL), Wayne Higgins (NCEP/CPC), Jin Huang (NCEP/CTB), Arun Kumar (NCEP/CPC), Bill Lapenta (NCEP/EMC), Annarita Mariotti (CPO), Avichal Mehra (NCEP/EMC), Shrinivas Moorthi (NCEP/EMC), V Ramaswamy (GFDL), Tony Rosati (GFDL), Jim Todd (CPO), Hendrik Tolman (NCEP/EMC), Louis Uccellini (NCEP), Gabriel Vecchi (GFDL), Michael Winton (GFDL), Yan Xue (NCEP/CPC)